

## **Horsethief Lake**

Horsethief Lake is a 17-acre lake located on state highway 244, 3.9 miles west of Mount Rushmore National Memorial. Horsethief campground is located on the lake. Horsethief has great shore access and hiking around the entirety of the lake. Horsethief gets stocked annually with rainbow trout. But is also home to an invasive fish called European Rudd, which will look like a goldfish.

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Horsethief, Pennington County

MCS-Lake-8-000

2024

## Lake Information

**Name:** Horsethief

**County:** Pennington

**Surface Area:** 17 Acres

## Surveys and Investigations

Survey methods used by gear type, date, and effort.

Gear	Date	Effort
frame net (std 3/4 in)	Jun 26, 2024	2 net-nights
frame net (std 3/4 in)	Jun 27, 2024	2 net-nights
miniature frame net	Jun 26, 2024	1 net-nights
miniature frame net	Jun 27, 2024	1 net-nights
minnow trap	Jun 27, 2024	2

## **Common Fish Species Present**

Rainbow Trout

Rudd

White Sucker

Golden Shiner

Fathead Minnow

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## Terminology

Catch per unit effort (**CPUE**) refers to the relative abundance of a species. It is defined as the number of fish captured per unit of effort (i.e., number of fish captured per net-night or number of fish captured per hour electrofishing). In this report CPUE is typically given for only stock-length fish (see length categories table for stock lengths).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- **std experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

$$CPUE = \frac{\text{number of fish}}{\text{effort}}$$

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

$$PSD = \left( \frac{\text{number of fish} \geq \text{quality length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

$$PSD - P = \left( \frac{\text{number of fish} \geq \text{preferred length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

Relative weight (**Wr**) is used to quantify fish plumpness. Relative weight is the ratio of what a fish weighs (*W*) compared to a length-specific standard weight (*Ws*) multiplied by 100. Relative weight values of 95-105 are commonly cited as optimum values, but values in the 80s are common during summer sampling in South Dakota.

$$Wr = \left( \frac{W}{W_s} \right) \times 100$$

Confidence intervals (CI) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (S), quality (Q), preferred (P), memorable (M) and trophy (T). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Walleye	10	25	15	38	20	51	25	63	30	76
White Bass	6	15	9	23	12	30	15	38	18	46
White Crappie	5	13	8	20	10	25	12	30	15	38
Yellow Bullhead	4	10	7	18	9	23	11	28	14	36
Yellow Perch	5	13	8	20	10	25	12	30	15	38

## Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

\* **Methods/Species that ignore stock length**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
frame net (std 3/4 in)	Golden Shiner	1806	0.0	0.0						
	Rainbow Trout	15	2.8	1.9	9		0		71	10
	Rudd	326	77.8	70.0	33	4	19	3		
	White Sucker	3	0.8	0.8	100		33		93	12
miniature frame net	Fathead Minnow	20	0.0	0.0						
	Golden Shiner	141	0.0	0.0						

## 10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

\* **Methods/Species that ignore stock length**

Gear	Species	CPUE										Avg
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
frame net (std 3/4 in)	Golden Shiner										0.0	0.00
	Rainbow Trout										2.8	2.80
	Rudd										77.8	77.80
	White Sucker										0.8	0.80
miniature frame net	Fathead Minnow										0.0	0.00
	Golden Shiner										0.0	0.00

## **10-Year Size Structure and Condition Statistics by Gear and Species**

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years.

Gear	Species	Index	Year											
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024		
frame net (std 3/4 in)	Rainbow Trout	PSD												9
		PSD-P												0
		Wr												71
	Rudd	PSD												33
		PSD-P												19
	White Sucker	PSD												100
		PSD-P												33
		Wr												93

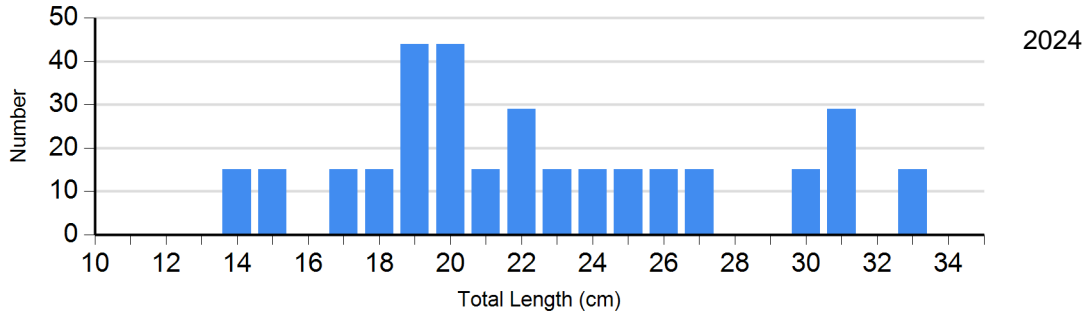


## Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Rudd

Gear: frame net (std 3/4 in)

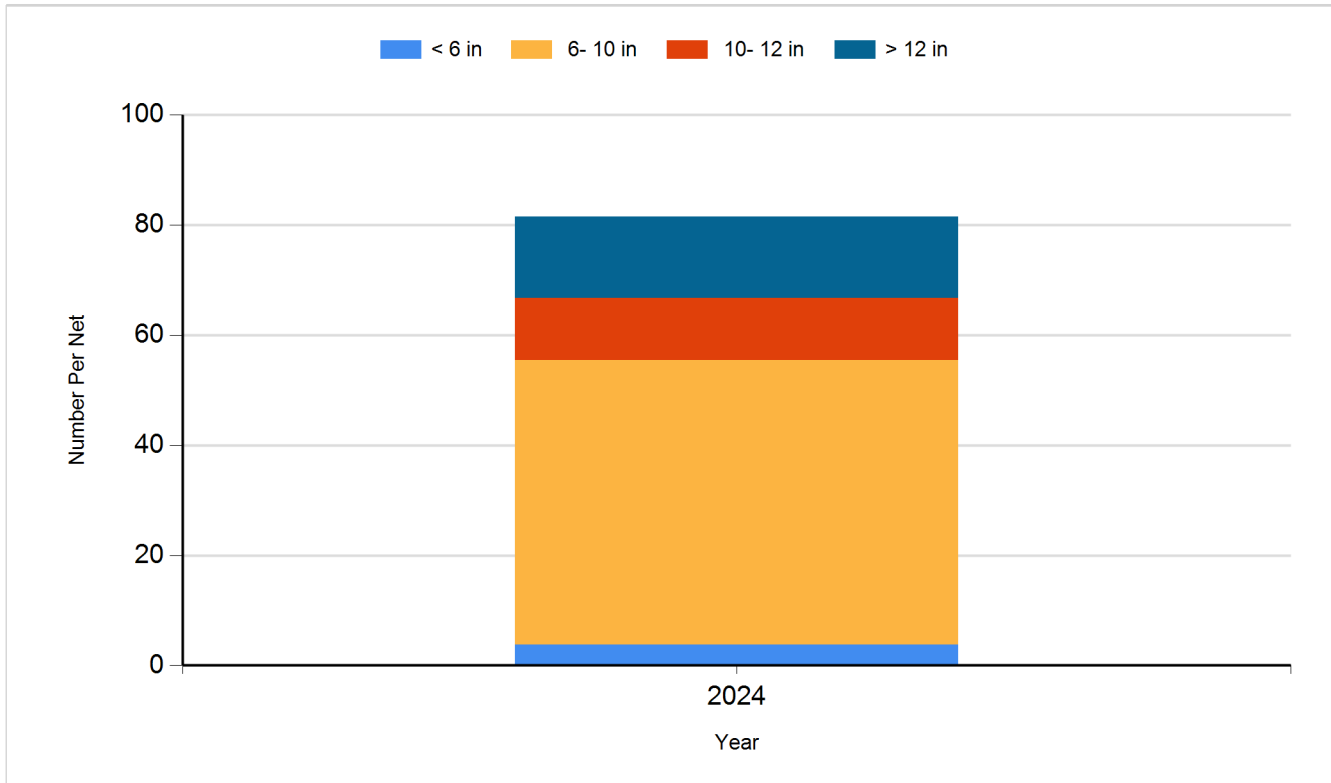


## Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.

Species: Rudd

Gear: frame net (std 3/4 in)



## **Fish Stocking**

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2013	Rainbow Trout (Erwin x Arlee)	Catchable 15"	250
2013	Rainbow Trout (Shasta)	Catchable	6,000
2014	Rainbow Trout (Erwin x Arlee)	Catchable 15"	200
2014	Rainbow Trout (Shasta)	Catchable	4,500
2015	Rainbow Trout (Erwin x Arlee)	Catchable	2,500
2015	Rainbow Trout (Erwin x Arlee)	Catchable 15"	300
2015	Rainbow Trout (Shasta)	Catchable	4,000
2016	Brown Trout (Plymouth Rock)	Catchable 11"	700
2016	Rainbow Trout (Erwin x Arlee)	Catchable	2,500
2016	Rainbow Trout (Erwin x Arlee)	Catchable 15"	250
2016	Rainbow Trout (Shasta)	Catchable	4,000
2017	Brown Trout (Plymouth Rock)	Catchable	1,173
2017	Rainbow Trout (Eagle Lake)	Catchable	1,000
2017	Rainbow Trout (Erwin x Arlee)	Catchable	4,500
2017	Rainbow Trout (Shasta)	Catchable	1,000
2018	Brown Trout (Plymouth Rock)	Catchable	500
2018	Rainbow Trout (Shasta)	Catchable 11"	6,500
2019	Brown Trout (Plymouth Rock)	Catchable	386
2019	Rainbow Trout (Erwin x Arlee)	Catchable 11"	2,000
2019	Rainbow Trout (Shasta)	Catchable 11"	3,460
2020	Rainbow Trout (Arlee)	Catchable 11"	6,100
2020	Rainbow Trout (Shasta)	Catchable 11"	395
2021	Rainbow Trout (Arlee)	Catchable 11"	2,000
2021	Rainbow Trout (Shasta)	Adult	4,500
2022	Rainbow Trout (Shasta)	Adult	2,000
2022	Rainbow Trout (Trout Lodge)	Adult	2,500
2023	Rainbow Trout	Adult	6,500
2023	Rainbow Trout (Trout Lodge)	Adult	1,000
2024	Black Crappie		17
2024	Rainbow Trout	Adult	5,982